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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,941	02/06/2004	Guoyi Fu	13584	7954
24114	7590	03/01/2006	EXAMINER	
LYONDELL CHEMICAL COMPANY 3801 WEST CHESTER PIKE NEWTOWN SQUARE, PA 19073			VANOY, TIMOTHY C	
			ART UNIT	PAPER NUMBER
			1754	

DATE MAILED: 03/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/773,941

Applicant(s)

FU ET AL.

Examiner

Timothy C. Vanoy

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– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☒ Claim(s) 1 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 04/16/2004.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Information Disclosure Statement*

The information disclosure statement filed on Apr. 16, 2004 does not fully comply with the requirements of 37 CFR 1.98(b) because there are no copies of the literature references titled "Zirconium Compounds in Catalysts," [www.zrchem.com](http://www.zrchem.com), Nov/Dec. 1992 or for the literature reference titled "Sulfated Zirconia – A Catalyst Isomerisation Reactions," undated. Since the submission appears to be *bona fide*, applicant is given **ONE (1) MONTH** from the date of this notice to supply the above mentioned omissions or corrections in the information disclosure statement. NO EXTENSION OF THIS TIME LIMIT MAY BE GRANTED UNDER EITHER 37 CFR 1.136(a) OR (b). Failure to timely comply with this notice will result in the above mentioned information disclosure statement being placed in the application file with the noncomplying information **not** being considered. See 37 CFR 1.97(i).

### *Specification*

- a) The abstract is objected to because it does not provide any details of the "appropriate conditions". The abstract is objected to because it does not provide any illustrative examples of the "stabilizing agent" or the "nano-structured particles".

### *Claim Objections*

- a) Claim 1 is objected to because surface area is not usually referred to as "surface area to mass ratio". In claim 1 line 2, it is suggested to delete "to mass ratio".

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

The person having ordinary skill in the art has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this application reasonably reflect this level of skill.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-27 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U. S. Patent 5,786,294 to Sachtler et al.

Example 1 in U. S. Patent 5,786,294 describes a method for making stabilized zirconia, comprising the steps:

Providing a solution of hexadecane amine (i. e. the applicants' base) and also a solution of  $\text{Zr}(\text{OPr})_4$ ;

Mixing together these two solutions to form a large amount of precipitate;

Separating off the precipitate from the solution and drying the solids;

Soaking the sample in 0.5M sulfuric acid and filtering off the resulting sulfated sample;

Drying the sulfated sample, and

Calcining the sulfated sample to produce a sulfated mesoporous zirconia.

Col. 10 lines 58-64 reports that the sulfate ion is not unique. Other transition metal oxides such as  $\text{WO}_3$ ,  $\text{MoO}_3$  and  $\text{Y}_2\text{O}_3$  are expected to have the same effect on the morphology of the zirconia. Such additives will thus also lead to mesoporous zirconia and other new mesoporous catalysts.

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While Example 1 reports that the composition was aged at room temperature, col. 12 lines 15-19 reports that the aging can be conducted at temperatures as high as 130 °C, and that such high temperature aging does not change the crystalline morphology of the large particles.

The table set forth in Example 8 sets forth that the content of t-ZrO<sub>2</sub> (i. e. tetragonal zirconia: please also see col. 3 lines 46-48, col. 5 lines 31-33 and also col. 7 lines 54-59) may be as high as 0.94 gram/gram.

Col. 4 lines 47-52 reports that the sulfated zirconium dioxide catalyst has a surface area ranging from 50 to 150 m<sup>2</sup>/g and a pore size ranging from 2.5 to 4.7 nm in diameter.

Col. 3 lines 50-54 reports that mesoporous zirconia can be used in conjunction with platinum, palladium, rhodium, ruthenium, or nickel metals as catalysts to effect synthetic transformations.

The difference between the applicants' claims and U. S. Patent 5,786,294 is that applicants' claim 1 sets forth that the particles have a size ranging from 5 to 50 nm, and applicants' claim 7 reports a particle size ranging from 5 to 20 nm. (whereas U. S. Patent 5,786,294 appears to be silent with respect to particle size), however it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because the methods for preparing the particles appear to be the same and since the other characteristics of the particles also appear to be the same then it is reasonably expected that the particle sizes for the applicants' particles and the particles of U. S. Patent 5,786,294 will also be the same. The same

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process for preparing the same particles is expected to inherently produce particles in the same size range. Since this difference is submitted to inherently occur in the process of U. S. Patent 5,786,294, then these claims are rejected under 35USC102 – as well as 35USC103.

The difference between the applicants' claims and U. S. Patent 5,786,294 is that applicants' claim 19 describes the precipitate from the reaction between the precursor and the base as a "colloidal hydrous oxide" (whereas Example 1 in U. S. Patent 5,786,294 only identifies the precipitate as a "precipitate" or "solid").

A comparison of the applicants' invention to U. S. Patent 5,786,294 reveals that the same base is being used, and also the same precursors are being used (please compare the "Zr(OPr)<sub>4</sub>" in Example 1 in U. S. Patent 5,786,294 to the "organic zirconium compound" of applicants' claim 21).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further describe the precipitate resulting from the same mixing of the same base and same precursor as a "colloidal hydrous oxide" as set forth in at least applicants' claim 19 because the same reaction between the same base and the same precursor is expected to inherently produce the same precipitate (i. e. the "colloidal hydrous oxide" of applicants' claim 19). Since this difference is expected to inherently occur in the process of U. S. Patent 5,786,294, then the claims are rejected under 35USC102 – as well as 35USC103.

The difference between the applicants' claims and U. S. Patent 5,786,294 is that applicants' claim 19 describes the pH of the precipitate-containing solution, however it is

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submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because it is reasonably expected that the same process for mixing the same base with the same precursor to produce the same precipitate will inherently produce the same precipitate-containing solution at the same claimed pH. Since this difference is expected to inherently occur in the process of U. S. Patent 5,786,294, then the claims are rejected under 35USC102 – as well as 35USC103.

The following references, which are indicative of the state of the art, are made of record:

U. S. Patent 5,011,674 disclosing the addition of an alkali to a solution to produce titanium hydroxide, and calcining the titanium hydroxide (please see the abstract);

U. S. Patent 6,841,143 B2 disclosing mesostructured oxide ceramics and their synthesis;

U. S. Patent App'n. Pub. No. US 2003/0113254 A1 disclosing a method for manufacturing stabilized zirconia;

U. S. Patent App'n. Pub. No. US 2004/0007531 A1 disclosing hydrous zirconium oxide, hydrous hafnium oxide and a method for making the same;

U. S. Patent App'n. Pub. No. US 2004/0067193 A1 disclosing a method for producing titanium oxide;

U. S. Patent App'n. Pub. No. US 2004/0191162 A1 disclosing a method for hydrolyzing zirconyl chloride with a base solution (please see the abstract), and

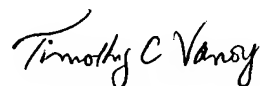


U. S. Patent App'n. Pub. No. US 2005/0201917 A1 disclosing a partially crystalline mesostructured material.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy C. Vanoy whose telephone number is 571-272-8158. The examiner can normally be reached on Mon-Fri 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Timothy C Vanoy  
Patent Examiner  
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